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10/015,757	12/17/2001	Hyung-Jun Kim	P67358US0	7540
7590	11/07/2003		EXAMINER	
JACOBSON, PRICE, HOLMAN & STERN PROFESSIONAL LIMITED LIABILITY COMPANY 400 Seventh Street, N.W. Washington, DC 20004			LEWIS, MONICA	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 11/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/015,757	KIM, HYUNG-JUN <i>KW</i>	
	Examiner Monica Lewis	Art Unit 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 06 August 2003.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1,3-8 and 10-14 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1,3-8 and 10-14 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 17 December 2001 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.	6) <input type="checkbox"/> Other: _____

DETAILED ACTION

1. This action is in response to the amendment filed August 6, 2003.

Response to Arguments

2. Applicant's arguments with respect to claims 1, 3-8 and 10-14 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1, 3, 4, 5-8 and 10-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is not clear what is meant by the following: a) "a plurality of metal wire patterns being formed at a same pattern" (See Claims 1 and 5); and b) "a plurality of dummy metal wire patterns being formed at a same pattern" (See Claim 14). Claims 3, 4, 6-8 and 10-13 depend directly or indirectly from a rejected claim and are, therefore, also rejected under 35 U.S.C. 112, second paragraph for the reasons set above.

Specification

5. The amendment filed August 6, 2003 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: a) dummy metal wire patterns (See Claim 14). Applicant is required to cancel the new matter in the reply to this Office Action.

Drawings

6. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “dummy metal wire patterns” must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1, 3, 5, 6, 8, 10 and 12-14 are rejected under 35 U.S.C. 103(a) as obvious over Kim et al. (U.S. Patent No. 5,534,728) and Yata et al. (U.S. Patent No. 6,534,459).

In regards to claim 1, Kim et al. (“Kim”) discloses the following:

a) a plurality of metal wire patterns which include a fine line pattern and pad patterns (For Example: See Figure 4).

In regards to claim 1, Kim fails to disclose the following:

a) a sub-micron width.

However, Yata et al. (“Yata”) discloses the sub-micron width (For Example: See Column 3 Lines 54-65). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Kim to include that the

width is sub-micron as disclosed in Yata because it aids in preventing corrosion (For Example: See Column 3 Lines 54-65).

Additionally, since Kim and Yata are both from the same field of endeavor, the purpose disclosed by Yata would have been recognized in the pertinent art of Kim.

Finally, the applicant has not established the critical nature of a plurality of metal wire patterns, which include a fine line pattern having a sub-micron width. “The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range.” *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have various ranges.

b) an area of the fine line pattern being more than 1% of a total area of said plurality of metal wire patterns.

Although Kim does not explicitly state that the fine line pattern is more than 1% of a total area of said plurality of metal wire patterns, the Examiner is permitted to give a claim the broadest reasonable interpretation consistent with the specification. See MPEP § 2111. The claim fails to describe a definitive area of the fine line pattern in relation to the overall layout of the metal wire patterns. Additionally, it is true that Kim does not explicitly state that the area of the fine line pattern is more than 1% of a total area of plurality of metal wire patterns, however it is clear that Kim shows a fine line pattern-metal wire pattern orientation in the same manner as claimed. It would have been obvious to one of ordinary skill in the art to allocate the claimed

pattern ratio to establish electrical communication between the chip and peripheral components since such technology was well known in the art at the time the invention was made.

Finally, the applicant has not established the critical nature of an area of the fine line pattern being more than 1% of a total area of said plurality of metal wire patterns. "The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have various ranges.

In regards to claim 3, Kim discloses the following:

a) the pad patterns include connection pad patterns which electrically connect the pad patterns to the fine line pattern, said connection pad patterns being included in said total area (For Example: See Figure 4).

In regards to claim 5, Kim discloses the following:

a) a plurality of metal wire patterns which include main fine line patterns, main pad patterns and dummy fine line patterns (For Example: See Figure 4).

In regards to claim 5, Kim fails to disclose the following:

a) a sub-micron width.

However, Yata discloses the sub-micron width (For Example: See Column 3 Lines 54-65). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Kim to include that the width is sub-micron as disclosed in Yata because it aids in preventing corrosion (For Example: See Column 3 Lines 54-65).

Additionally, since Kim and Yata are both from the same field of endeavor, the purpose disclosed by Yata would have been recognized in the pertinent art of Kim.

Finally, the applicant has not established the critical nature of a plurality of metal wire patterns, which include a fine line pattern having a sub-micron width. "The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have various ranges.

b) an area of the dummy fine line patterns, which are connected to the pad patterns, being less than 1% of a total area of said plurality of metal wire patterns and also being less than a value obtained by dividing an area of the main fine line patterns by said total area.

Although Kim does not explicitly state that an area of the dummy fine line patterns, which are connected to the pad patterns are less than 1% of a total area of said plurality of metal wire patterns and less than a value obtained by dividing an area of the main fine line patterns by said total area, the Examiner is permitted to give a claim the broadest reasonable interpretation consistent with the specification. See MPEP § 2111. The claim fails to describe a definitive area of the dummy fine line pattern in relation to the overall layout of the metal wire patterns. Additionally, it is true that Kim does not explicitly state that an area of the dummy fine line patterns, which are connected to the pad patterns are less than 1% of a total area of said plurality of metal wire patterns and less than a value obtained by dividing an area of the main fine line patterns by said total area, however it is clear that Kim shows a dummy fine line pattern-metal

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wire pattern orientation in the same manner as claimed. It would have been obvious to one of ordinary skill in the art to allocate the claimed pattern ratio to establish electrical communication between the chip and peripheral components since such technology was well known in the art at the time the invention was made.

Finally, the applicant has not established the critical nature of an area of the fine line pattern being more than 1% of a total area of said plurality of metal wire patterns. "The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have various ranges.

In regards to claim 6, Kim discloses the following:

a) the dummy fine line patterns are formed parallel with the main fine line patterns at a distance of a width of the main fine line pattern (For Example: See Figure 4).

In regards to claim 8, Kim discloses the following:

a) the dummy fine line patterns do not form or contribute to any electric circuit (For Example: See Abstract).

In regards to claim 10, Kim discloses the following:

a) the plurality of metal wire patterns further include dummy pad pool patterns, to which the dummy fine line patterns are connected, said dummy pad pool patterns and said dummy fine line patterns being electrically disconnected from the main fine line patterns and the main pad patterns (For Example: See Abstract and Figure 4).

In regards to claim 12, Kim discloses the following:

a) the plurality of metal wire patterns further include connection pad patterns which electrically connect the main pad patterns to the fine line patterns, said connection pad patterns being included in said total area (For Example: See Abstract and Figure 4).

In regards to claim 13, Kim fails to disclose the following:

a) the total area is represented by $Ap+Ac+A+d$, where, 'd' represents the area of the dummy fine line patterns, 'Ap' represents an area of the main pad patterns, 'Ac' represents an area of the connection pad patterns and 'A' represents the area of the main fine line patterns.

Although Kim does not explicitly state that the total area is represented by $Ap+Ac+A+d$, the Examiner is permitted to give a claim the broadest reasonable interpretation consistent with the specification. See MPEP § 2111. While it is true that Kim does not explicitly state the total area is represented by $Ap+Ac+A+d$, it is clear that Kim shows the following in the same manner as claimed: a) a dummy fine line pattern; b) main pad pattern; c) connection pad pattern; and d) main fine line pattern. It would have been obvious to one of ordinary skill in the art to allocate the claimed area to establish electrical communication between the chip and peripheral components since such technology was well known in the art at the time the invention was made.

In regards to claim 14, Kim discloses the following:

a) a plurality of main metal wire patterns including main fine patterns having main pad patterns which are electrically connected to each other (For Example: See Figure 4);

b) a plurality of dummy metal wire patterns including dummy fine line patterns and dummy pad patterns which are electrically connected to each other (For Example: See Figure 4 and Abstract); and

c) main metal wire patterns and said plurality of dummy metal wire patterns being electrically disconnected from each other (For Example: See Figure 4 and Abstract).

In regards to claim 14, Kim fails to disclose the following:

a) a sub-micron width.

However, Yata discloses the sub-micron width (For Example: See Column 3 Lines 54-65). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Kim to include that the width is sub-micron as disclosed in Yata because it aids in preventing corrosion (For Example: See Column 3 Lines 54-65).

Additionally, since Kim and Yata are both from the same field of endeavor, the purpose disclosed by Yata would have been recognized in the pertinent art of Kim.

b) an area of said dummy fine line patterns being formed to be less than 1% of a total area of said plurality of dummy metal wire patterns and also being less than a value obtained by dividing an area of the main fine patterns by a total area of said plurality of main metal wire patterns.

Although Kim does not explicitly state an area of said dummy fine line patterns being formed to be less than 1% of a total area of said plurality of dummy metal wire patterns and also being less than a value obtained by dividing an area of the main fine patterns by a total area of said plurality of main metal wire patterns, the Examiner is permitted to give a claim the broadest reasonable interpretation consistent with the specification. See MPEP § 2111. The claim fails to describe a definitive area of the dummy fine line pattern in relation to the overall layout of the metal wire patterns. Additionally, it is true that Kim does not explicitly state that an area of the dummy fine line patterns, which are connected to the pad patterns are less than 1% of a total area of said plurality of metal wire patterns and less than a value obtained by dividing an area of the main fine line patterns by said total area, however it is clear that Kim shows a dummy fine line pattern-metal wire pattern orientation in the same manner as claimed. It would have been obvious to one of ordinary skill in the art to allocate the claimed pattern ratio to establish

electrical communication between the chip and peripheral components since such technology was well known in the art at the time the invention was made.

Additionally, the applicant has not established the critical nature of an area of said dummy fine line patterns being formed to be less than 1% of a total area of said plurality of dummy metal wire patterns and also being less than a value obtained by dividing an area of the main fine patterns by a total area of said plurality of main metal wire patterns. "The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have various ranges.

Finally, the Supreme Court has not been clear . . . as to whether such subject matter is excluded from the scope of 101 because it represents laws of nature, natural phenomena, or abstract ideas. See *Diehr*, 450 U.S. at 186 (viewed mathematical algorithm as a law of nature); *Gottschalk v. Benson*, 409 U.S. 63, 71-72 (1972) (treated mathematical algorithm as an "idea"). The Supreme Court also has not been clear as to exactly what kind of mathematical subject matter may not be patented. The Supreme Court has used, among others, the terms "mathematical algorithm," "mathematical formula," and "mathematical equation" to describe types of mathematical subject matter not entitled to patent protection standing alone. The Supreme Court has not set forth, however, any consistent or clear explanation of what it intended by such terms or how these terms are related, if at all. Certain mathematical algorithms have

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been held to be nonstatutory because they represent a mathematical definition of a law of nature or a natural phenomenon. For example, a mathematical algorithm representing the formula $E = mc^2$ is a "law of nature" - it defines a "fundamental scientific truth" (i.e., the relationship between energy and mass). To comprehend how the law of nature relates to any object, one invariably has to perform certain steps (e.g., multiplying a number representing the mass of an object by the square of a number representing the speed of light). In such a case, a claimed process which consists solely of the steps that one must follow to solve the mathematical representation of $E = mc^2$ is indistinguishable from the law of nature and would "preempt" the law of nature. A patent cannot be granted on such a process. See MPEP 2106.1

9. Claims 4, 7 and 11 are rejected under 35 U.S.C. 103(a) as obvious over Kim et al. (U.S. Patent No. 5,534,728) in view of Yata et al. (U.S. Patent No. 6,534,459) and Fontana et al. (*Corrosion Engineering*).

In regards to claim 4, Kim fails to disclose the following:

- a) the plurality of metal wire patterns are made of aluminum or copper.

However, Fontana et al. ("Fontana") discloses the use of aluminum (For Example: See Section 5-9). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Kim to include the use of aluminum as disclosed in Fontana because it aids in providing resistance to corrosion in many environments (For Example: See Section 5-9).

Additionally, since Kim and Fontana are both from the same field of endeavor, the purpose disclosed by Fontana would have been recognized in the pertinent art of Kim.

In regards to claims 7 and 11, Kim fails to disclose the following:

- a) the plurality of metal wire patterns are made of aluminum or copper wire.

However, Fontana discloses the use of aluminum (For Example: See Section 5-9). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Kim to include the use of aluminum as disclosed in Fontana because it aids in providing resistance to corrosion in many environments (For Example: See Section 5-9).

Additionally, since Kim and Fontana are both from the same field of endeavor, the purpose disclosed by Fontana would have been recognized in the pertinent art of Kim.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica Lewis whose telephone number is 703-305-3743. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian, can be reached on 703-308-4905. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722 for regular and after final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ML

November 1, 2003



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